

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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|-------------|---|-----------------|-------------------|
| Applicants: | Sherif Yacoub, et al.   | Examiner:       | Leonard Saint Cyr |
| Serial No.: | 10/668,141  | Group Art Unit: | 2626              |
| Filed:      | September 23, 2003  | Docket No.:     | 200300101-1       |
| Title:      | System and Method Using Multiple Automated Speech Recognition Engines |                 |                   |

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**APPEAL BRIEF UNDER 37 C.F.R. § 41.37**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is filed in response to the Final Office Action mailed March 1, 2010 and Notice of Appeal mailed May 3, 2010.

**AUTHORIZATION TO DEBIT ACCOUNT**

It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's deposit account no. 08-2025.

### **I. REAL PARTY IN INTEREST**

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 11445 Compaq Center Drive West, Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

## **II. RELATED APPEALS AND INTERFERENCES**

There are no known related appeals or interferences known to Appellant, Appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Appeal Board's decision in the pending appeal.

### **III. STATUS OF CLAIMS**

Claims 1, 4 – 8, and 11 – 20 are pending in the application and stand finally rejected. Claims 2 – 3 and 9 – 10 were canceled. The rejection of claims 1, 4 – 8, and 11 – 20 is appealed.

#### **IV. STATUS OF AMENDMENTS**

No amendments were made after receipt of the Final Office Action. All amendments have been entered.

## **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The following provides a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number and to the drawings by reference characters, as required by 37 C.F.R. § 41.37(c)(1)(v). Each element of the claims is identified by a corresponding reference to the specification and drawings where applicable. Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element or that these are the sole sources in the specification supporting the claim features.

### **Claim 1**

A method of automatic speech recognition (ASR), comprising: (Figure 3 shows a method of automated speech recognition using plural different ASR engine. The method is described in connection with Figure 1: see paragraph [0031] on p. 8)

receiving a speech utterance from a user; (Fig. 3, #300: A participant or user (such as a telephone caller) telephones or otherwise establishes communication between communication device 40 and communication network 10. Per block 300, the communication device provides communication network 10 with an electronic input signal in a digital format. See paragraph [0031] on p. 8.)

assessing resources by monitoring both port utilization and processing utilization of each of a plurality of different ASR engines to determine which of the plurality of different ASR engines are busy serving users; (Fig. 3, #310: Per block 310, the host computer 50 assesses the resources of the system. At this stage, for example, ports of different ASR engines 60, memory 90, database 100, or processing power of CPU 80 can be evaluated for availability. See paragraph [0032] on p. 8. Per blocks 320 and 330, a determination is made which ASR engines are busy: see paragraph [0033] and [0034] on p. 8)

assigning the speech utterance to a single ASR engine when the plurality of different ASR engines are busy such that the port and processing utilizations are within a threshold value; (Fig. 3, #330: Per block 330, if the system is busy, the host computer 50, in cooperation with the resource management application 110, assigns the input signal to a single ASR engine. See paragraph [0034] on p. 8.)

assigning the speech utterance to the plurality of different ASR engines when the plurality of different ASR engines are not busy such that the port and processing utilizations are within a threshold value; and (Fig. 3, # 350: On the other hand, per block 350, if the system is not busy, the host computer, in cooperation with the resource management application 110, assigns the input signal to multiple ASR engines. Here, the recognized text from the selected ASR engines is combined to yield more accurate recognized text when compared to a single ASR engine. See paragraph [0035] on p. 8.)

generating text of the speech utterance with either the single ASR engine or the plurality of different ASR engines. (Fig. 3, #340 and 360: The assigned ASR engine or engines generate the recognized text of the input signal. See paragraphs [0034] and [0035] on p. 8.)

#### Claim 8

An automatic speech recognition (ASR) system comprising: (FIG. 1 shows three ASR systems 60A, 60B, and 60C. FIG. 2 shows a block diagram of an exemplary embodiment of an ASR system 60A: see paragraph [0021].)

means for processing a digital input signal from an utterance of a user; (Example means is CPU 80 in Fig. 1. Per block 300 in Fig. 3, a participant or user (such as a telephone caller) telephones or otherwise establishes communication between communication device 40 and communication network 10. Per block 300, the communication device provides communication network 10 with an electronic input signal in a digital format. See paragraph [0031].)

means for evaluating resources of the ASR system to determine whether the ASR system is busy processing utterances of users by monitoring port

utilization and available processing power of each of a group of ASR engines; and (Example means is host computer 50 in Fig. 1. The host computer 50 assesses the resources of the system. Per block 310 of Fig. 3, the host computer 50 assesses the resources of the system. At this stage, for example, ports of different ASR engines 60, memory 90, database 100, or processing power of CPU 80 can be evaluated for availability. See paragraph [0032] on p. 8.)

means for selecting between a single ASR engine and the group of ASR engines to recognize the utterance of the user, wherein the means for selecting utilizes the evaluation of resources to select the single ASR engine when the port utilization and available processing power are within a threshold and the ASR system is busy processing the utterances of the users and to select the group of ASR engines when the port utilization and available processing power are within another threshold and the ASR system is not busy processing the utterances of the users. (Example means is host computer 50 in Fig. 1. The host computer 50 selects between a single ASR engine or multiple different ASR engines. Per block 330 in Fig. 3, if the system is busy, the host computer 50, in cooperation with the resource management application 110, assigns the input signal to a single ASR engine. Per block 350 in Fig. 3, if the system is not busy, the host computer, in cooperation with the resource management application 110, assigns the input signal to multiple ASR engines. See paragraphs [0034] and [0035] on p. 8.)

#### Claim 14

A system, comprising: (Fig. 1 shows a diagram of a voice telephone system, and Fig. 2 shows a diagram of an ASR system: see paragraphs [0020] and [0021] on p. 5.)

a computer system comprising a central processing unit coupled to a memory and resource management application; and (Fig. 1 shows a host computer system 50 comprising a CPU 80, memory 90, extracted algorithm 110, and resource management application 110 coupled through buses 120. See paragraph [0019])



a plurality of different automatic speech recognition (ASR) engines coupled to the computer system, wherein the resource management application assesses resources being used by each of the plurality of different ASR engines by monitoring port utilization and available processing power of each of the plurality of different ASR engines, and the computer system selects a single ASR engine to analyze a speech utterance when the system is busy such that the port utilization and the processing power are within a threshold and selects multiple ASR engines to analyze the speech utterance when the system is not busy such that the port utilization and the processing power are within another threshold. (Fig. 1 shows plural ASR systems 60A, 60B, and 60C coupled to the computer system 50. See paragraph [0018] on p. 4. The host computer 50 selects between a single ASR engine or multiple different ASR engines. Per block 330 in Fig. 3, if the system is busy, the host computer 50, in cooperation with the resource management application 110, assigns the input signal to a single ASR engine. Per block 350 in Fig. 3, if the system is not busy, the host computer, in cooperation with the resource management application 110, assigns the input signal to multiple ASR engines. See paragraphs [0034] and [0035] on p. 8.)

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 1, 5 – 8, and 11 – 20 are rejected under 35 USC § 103(a) as being unpatentable over USPN 6,975,993 (Keiller) in view of USPN 6,798,786 (Lo).

Claim 4 is rejected under 35 USC § 103(a) as being unpatentable over USPN 6,975,993 (Keiller) in view of USPN 6,798,786 (Lo) and US publication number 2005/0044228 (Birkestrand).

## **VII. ARGUMENT**

The rejection of claims 1, 4 – 8, and 11 – 20 is improper, and Appellants respectfully request reversal of these rejections.

The claims do not stand or fall together. Instead, Appellants present separate arguments for various independent and dependent claims. Each of these arguments is separately argued below and presented with separate headings and sub-heading as required by 37 C.F.R. § 41.37(c)(1)(vii).

### **Claim Rejections: 35 USC § 103(a)**

Claims 1, 5 – 8, and 11 – 20 are rejected under 35 USC § 103(a) as being unpatentable over USPN 6,975,993 (Keiller) in view of USPN 6,798,786 (Lo). These rejections are traversed.

### **Principles of Law: Obviousness**

The test for determining if a claim is rendered obvious by one or more references for purposes of a rejection under 35 U.S.C. § 103 is set forth in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007):

Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. Quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966).

As set forth in MPEP 2143.03, to ascertain the differences between the prior art and the claims at issue, “[a]ll claim limitations must be considered” because “all words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385.

According to the Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in view of *KSR International Co. v. Teleflex Inc.*, Federal Register, Vol. 72, No. 195, 57526, 57529 (October 10, 2007), once the *Graham* factual inquiries are resolved, there must be a determination of whether the claimed invention would have been obvious to one of ordinary skill in the art based on any one of the following proper rationales:

(A) Combining prior art elements according to known methods to yield predictable results; (B) Simple substitution of one known element for another to obtain predictable results; (C) Use of known technique to improve similar devices (methods, or products) in the same way; (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (E) “Obvious to try”—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007).

Furthermore, as set forth in *KSR International Co. v. Teleflex Inc.*, quoting from *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006), “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements;

instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”

Therefore, if the above-identified criteria and rationales are not met, then the cited reference(s) fails to render obvious the claimed invention and, thus, the claimed invention is distinguishable over the cited reference(s).

#### Differences Between the Art and Claims

Claims 1, 5 – 8, and 11 – 20 recite one or more elements that are not taught or suggested in Keiller in view of Lo. These missing elements show that the differences between the combined teachings in the art and the recitations in the claims are great. As such, the pending claims are not a predictable variation of the art to one of ordinary skill in the art.

These differences are shown below and presented with separate headings for different claim groups.

#### Sub-Heading: Claims 1 and 5 – 7

Independent claim 1 is selected for discussion.

As one example, independent claim 1 recites assessing resources by monitoring both port utilization and processing utilization of each of a plurality of different ASR engines to determine which of the plurality of different ASR engines are busy serving users. The claim then recites assigning the speech utterance to a single ASR engine when the plurality of different ASR engines are busy such that the port and processing utilizations are within a threshold value; and assigning the speech utterance to the plurality of different ASR engines when the plurality of different ASR engines are not busy such that the port and processing utilizations are within a threshold value. Keiller in view of Lo does not teach or suggest these claim elements.

Keiller teaches that “the speech manager 6 checks at step S906 in FIG. 28 whether there are ASR engines available on personal computer connected to the network” (see Keiller at column 20, lines 60-62). Keiller does not teach or even

suggest thresholds or monitoring both port and processing utilizations as recited in claim 1.

Lo teaches “a method of managing calls in a telephony system includes defining a plurality of communities each including one or more communication endpoints and assigning one or more usage threshold values to a link between communities” (see Lo at column 2, lines 3-7). Lo has a call server that limits bandwidth usage when usage reaches a predetermined threshold (see Lo at column 7, lines 46-48). Lo, however, uses thresholds in a very different manner than the recitations of claim 1. Lo does not monitor both port utilization and processing utilization of ASR engines as recited in claim 1. Furthermore, Lo does not assign ASR engines based on whether the port and processing utilizations are within a threshold. Instead, Lo uses thresholds to limit bandwidth usage of callers.

In the Final Office Action, the examiner argues that Lo teaches managing calls “based on one or more usage threshold values” (see FOA at p. 2). Even assuming arguendo that Lo teaches manages calls based on multiple threshold values, Lo never teaches or suggests that these thresholds include both port and processing utilizations of multiple ASR engines. In other words, claim 1 recites specific recitations regarding both port and processing utilizations that are not taught or even suggested in Lo.

The differences between the claims and the teachings in the art are great since the references fail to teach or suggest all of the claim elements. As such, the pending claims are not a predictable variation of Keiller in view of Lo to one of ordinary skill in the art.

For at least these reasons, claims 1 and 5 – 7 are allowable over Keiller in view of Lo.

#### Sub-Heading: Claims 8 and 11 – 13

Independent claim 8 is selected for discussion.

As one example, independent claim 8 recites means for evaluating resources of the ASR system to determine whether the ASR system is busy

processing utterances of users by monitoring port utilization and available processing power of each of a group of ASR engines. The claim then recites means for selecting that utilizes the evaluation of resources to select the single ASR engine when the port utilization and available processing power are within a threshold and the ASR system is busy processing the utterances of the users and to select the group of ASR engines when the port utilization and available processing power are within another threshold and the ASR system is not busy processing the utterances of the users.

Keiller does not teach or even suggest thresholds and monitoring port utilization and available processing power as recited in claim 8. Lo discusses thresholds but uses thresholds in a very different method to **limit bandwidth usage of callers**.

The differences between the claims and the teachings in the art are great since the references fail to teach or suggest all of the claim elements. As such, the pending claims are not a predictable variation of Keiller in view of Lo to one of ordinary skill in the art.

For at least these reasons, claims 8 and 11 – 13 are allowable over Keiller in view of Lo

#### Sub-Heading: Claims 14 – 20

Independent claim 14 is selected for discussion.

As one example, independent claim 14 recites a resource management application that assesses resources being used by each of the plurality of different ASR engines by monitoring port utilization and available processing power of each of the plurality of different ASR engines. The claim then recites that the computer system selects a single ASR engine to analyze a speech utterance when the system is busy such that the port utilization and the processing power are within a threshold and selects multiple ASR engines to analyze the speech utterance when the system is not busy such that the port utilization and the processing power are within another threshold.

Keiller does not teach or even suggest thresholds and monitoring port utilization and available processing power as recited in claim 14. Lo discusses thresholds but uses thresholds in a very different method to limit bandwidth usage of callers.

The differences between the claims and the teachings in the art are great since the references fail to teach or suggest all of the claim elements. As such, the pending claims are not a predictable variation of Keiller in view of Lo to one of ordinary skill in the art.

For at least these reasons, claims 14 – 20 are allowable over Keiller in view of Lo.

Sub-Heading: Claim 5

Dependent claim 5 recites wherein assessing resources further comprises monitoring a number of users providing speech utterances. The examiner argues that this claim element is taught in column 1, lines 62 – 66 in Lo. Appellants respectfully traverse.

Column 1, lines 62 – 66 in Lo teaches determining usage information to manage calls. Lo, however, never specifies or suggests monitoring a number of users providing speech utterances. Instead, Lo merely makes a general statement about receiving a call request, but does not monitor how many users provide utterances.

For at least these reasons, claim 5 is allowable over Keiller in view of Lo.

Sub-Heading: Claim 6

Dependent claim 6 recites wherein assigning the speech utterance to a single ASR engine if assessing resources is within a threshold value occurs when port utilization of the single ASR engine is lower than a port utilization threshold of about 80%. The examiner argues that this claim element is taught in column 1, line 66 – column 2, line 9 in Lo. Appellants respectfully traverse.

Column 1, line 66 – column 2, line 9 in Lo merely teaches that a call request is based on one or more thresholds. Lo, however, never suggests details



that would include assessing resources is within a threshold value occurs when port utilization of the single ASR engine is lower than a port utilization threshold of about 80%.

For at least these reasons, claim 6 is allowable over Keiller in view of Lo.

Sub-Heading: Claim 7

Dependent claim 7 recites wherein assigning the speech utterance to a plurality of different ASR engines if assessing resources is within a threshold value occurs when port utilization of two ASR engines is lower than a predefined threshold of about 75%. The examiner argues that this claim element is taught in column 1, line 66 – column 2, line 9 in Lo. Appellants respectfully traverse.

Column 1, line 66 – column 2, line 9 in Lo merely teaches that a call request is based on one or more thresholds. Lo, however, never suggests details that would include assigning the speech utterance to a plurality of different ASR engines if assessing resources is within a threshold value occurs when port utilization of two ASR engines is lower than a predefined threshold of about 75%.

For at least these reasons, claim 7 is allowable over Keiller in view of Lo.

**Claim Rejections: 35 USC § 103(a)**

Claim 4 is rejected under 35 USC § 103(a) as being unpatentable over USPN 6,975,993 (Keiller) in view of USPN 6,798,786 (Lo) and US publication number 2005/0044228 (Birkestrand). These rejections are traversed.

As explained above, Keiller in view of Lo does not teach or suggest all elements of the independent claims. Birkestrand fails to cure these deficiencies. For at least the reasons given for independent claim 1, dependent claim 4 is allowable over Keiller in view of Lo and Birkestrand.

### **CONCLUSION**

In view of the above, Appellants respectfully request the Board of Appeals to reverse the Examiner's rejection of all pending claims.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. 832-236-5529. In addition, all correspondence should continue to be directed to the following address:

**Hewlett-Packard Company**  
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Mail Stop 35  
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Respectfully submitted,

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### **VIII. Claims Appendix**

1. A method of automatic speech recognition (ASR), comprising:

receiving a speech utterance from a user;

assessing resources by monitoring both port utilization and processing utilization of each of a plurality of different ASR engines to determine which of the plurality of different ASR engines are busy serving users;

assigning the speech utterance to a single ASR engine when the plurality of different ASR engines are busy such that the port and processing utilizations are within a threshold value;

assigning the speech utterance to the plurality of different ASR engines when the plurality of different ASR engines are not busy such that the port and processing utilizations are within a threshold value; and

generating text of the speech utterance with either the single ASR engine or the plurality of different ASR engines.

2. – 3. (canceled)

4. The method of claim 1 wherein assessing resources further comprises monitoring memory utilization and input/output utilization.

5. The method of claim 1 wherein assessing resources further comprises monitoring a number of users providing speech utterances.

6. The method of claim 1 wherein assigning the speech utterance to a single ASR engine if assessing resources is within a threshold value occurs when port utilization of the single ASR engine is lower than a port utilization threshold of about 80%.

7. The method of claim 1 wherein assigning the speech utterance to a plurality of different ASR engines if assessing resources is within a threshold value occurs when port utilization of two ASR engines is lower than a predefined threshold of about 75%.

8. An automatic speech recognition (ASR) system comprising:

means for processing a digital input signal from an utterance of a user;

means for evaluating resources of the ASR system to determine whether the ASR system is busy processing utterances of users by monitoring port utilization and available processing power of each of a group of ASR engines; and

means for selecting between a single ASR engine and the group of ASR engines to recognize the utterance of the user, wherein the means for selecting utilizes the evaluation of resources to select the single ASR engine when the port utilization and available processing power are within a threshold and the ASR system is busy processing the utterances of the users and to select the group of ASR engines when the port utilization and available processing power are within another threshold and the ASR system is not busy processing the utterances of

the users.

9. – 10. (canceled)

11. The ASR system of claim 8 further comprising a means for combining results of ASR engines if the group of ASR engines is selected, the group of ASR engines being adapted to provide a more accurate recognition of the utterance than a single ASR engine.

12. The ASR system of claim 8 wherein the means for evaluating resources of the system evaluates resources to simultaneously run multiple ASR engines.

13. The ASR system of claim 8 wherein the means for evaluating resources of the system evaluates ASR ports, system resources, and call handlers.

14. A system, comprising:

- a computer system comprising a central processing unit coupled to a memory and resource management application; and

- a plurality of different automatic speech recognition (ASR) engines coupled to the computer system, wherein the resource management application assesses resources being used by each of the plurality of different ASR engines by monitoring port utilization and available processing power of each of the plurality of different ASR engines, and the computer system selects a single ASR

engine to analyze a speech utterance when the system is busy such that the port utilization and the processing power are within a threshold and selects multiple ASR engines to analyze the speech utterance when the system is not busy such that the port utilization and the processing power are within another threshold.

15. The system of claim 14 wherein the computer system selects an ASR engine that has most available resources.

16. The system of claim 14 further comprising a telephone network comprising at least one switching service point coupled to the computer system.

17. The system of claim 16 further comprising at least one communication device in communication with the switching service point to provide the speech utterance.

18. The system of claim 14 wherein the resource management application comprises a recognition proxy component and a resource monitoring component.

19. The system of claim 18 wherein the resource management component collects and analyzes information about the resources available on the system.

20. The system of claim 19 wherein the resource monitoring component mediates between the plurality of ASR engines and the resource management component.

**IX. EVIDENCE APPENDIX**

None.



**X. RELATED PROCEEDINGS APPENDIX**

None.